## Space Weather Forecast

Issued on Saturday, 04 May 2024 at 12:23 Local

**This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales**

---

**Space Weather Forecast Headline: Further Moderate-class flares likely with a chance of Strong flares through the period. Minor-Moderate Geomagnetic storm conditions are likely in the coming days with a chance of Strong storm intervals.**

**Analysis of Space Weather Activity over past 24 hours**

**Solar Activity:** Solar activity is at High levels, due to a Moderate flare at 04/0619 UTC from an active region in the north-centre disc, which also produced a number of other Moderate flares. A region in the southeast has also been active. Another Moderate flare was observed from a region beyond the southwest limb late in the period. There are currently nine sunspot regions on the visible disc. Of these the two aforementioned regions, both with a complex magnetic structure, are the most active regions on the disc. A region approaching centre-disc developed rapidly. The remaining sunspot groups are much smaller and appear more magnetically simple.

There are potentially two Earth-directed Coronal Mass Ejections (CMEs) during the period. A CME that left the Sun around 01/0600 UTC from the southwest disc is expected to hit Earth late day 1 (04 May) or early day 2 (05 May). Additionally, a CME associated with the Strong flare at 03/0222 UTC has been analysed and may interact with Earth in the middle of day 2 (05 May). There are a couple of other possible CME events from the past 24 hours, one as a result of a filament (arc of Sun's material and plasma) eruption, and the other due to the Moderate flare at 04/0619 UTC mentioned above. Imagery and analysis is being awaited to determine any Earth-directed components of these.

**Solar Wind / Geomagnetic Activity:** Solar winds steadily declined from slightly elevated levels to near background levels, currently around 360-380km/s. The Interplanetary Magnetic Field was weak. The important north-south component was also weak. Resultant Geomagnetic activity was Quiet (Kp0-2).

**Energetic Particles / Solar Radiation:** Solar radiation was at normal background levels.

**Four-Day Space Weather Forecast Summary**

**Solar Activity:** Moderate to High solar activity is forecast to continue with further Moderate-flares expected and a chance of isolated Strong flares, principally from the large sunspot regions located in the north-centre and southeast disc.

**Solar Wind / Geomagnetic Activity:** Two Earth-directed CMEs currently feature in the forecast period. The first most likely arriving late on day 1 (04 May) or early day 2 (05 May) and the second expected at Earth midday 2 (05 May). Two other potential CMEs that left the sun late 03 May and early 04 May are awaiting analysis.

Initial normal background solar winds are expected to increase on day 1 (04 May) due to the influence of a large coronal hole. Speeds should become slightly elevated to elevated between days 1 and 3 (04-06 May). A second coronal hole enhancement is expected on days 3 and 4 (06 and 07 May), with speeds likely peaking at elevated to strong levels before starting to decline on

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2024. All Rights Reserved.

day 4 (07 May).

Combining effects from the various CMEs and coronal hole influences through the period results in a lower than average Geomagnetic forecast confidence.

Geomagnetic activity although initially Quiet, is expected to increase on day 1 (05 May), becoming Active to G1/Minor Storm by the end of the day with a chance of G2/Moderate to G3/Strong Storm conditions. Conditions will most likely average out at G1/Minor to G2/Moderate Storm levels on day 2 (06 May) with a chance of isolated G3/Strong Geomagnetic Storm intervals. Activity should generally subside into day 3 (06 May), though should predominantly remain between Unsettled and G1/Minor Storm levels, again with a chance of isolated G3/Strong Geomagnetic Storm intervals. By day 4 (07 May), Quiet to Unsettled conditions are most likely, but still with a chance of G1/Minor Storm conditions persisting for a time and also dependent on the analysis of the anticipated CME from late 03 May.

**Aurora Forecast:** Combined coronal hole and CME effects are likely in the coming days increasing the chance of enhanced auroral activity. Aurora may be visible during the limited hours of darkness in parts of Scotland and Northern Ireland and perhaps visible across parts of northern England and North Wales where skies remain clear. Activity is most likely to be greatest between Saturday and Sunday night, although timings of peak activity will be highly dependent on the arrival times of any enhancements.

**Energetic Particles / Solar Radiation:** Solar radiation levels is most likely to remain at background levels through the period. There is a slight chance for an S1/Minor Storm or greater event occurring days 1 and 2 (04 and 05 May), increasing to a chance days 3 and 4 (06 and 07 May), should any proton-rich flares occur, primarily from the large, complex sunspot region in the north-centre disc.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2024. All Rights Reserved.

# Space Weather Forecast

**Geomagnetic Storms:**

| Geo-Magnetic Storm Probability (Exceedance) | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Minor or Moderate | G1 to G2 | No | 80 | 90 | 70 | 30 |
| Strong | G3 | No | 30 | 40 | 20 | 5 |
| Severe | G4 | No | 5 | 10 | 5 | 1 |
| Extreme | G5 | No | 1 | 1 | 1 | 1 |

**Radio Blackouts - X Ray Flares:**

| X Ray Flares Probability | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | R1-R2 M Class | Yes | 80 | 80 | 80 | 80 |
| Very Active | R3 to R5 X | No | 25 | 25 | 25 | 25 |

**Solar Radiation Storms - (High Energy Protons):**

| Radiation Storms Probability (Exceedance) | Level ($cm^{-2}$ $sr^{-1}$ $s^{-1}$) | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | ≥ S1 | No | 15 | 15 | 20 | 20 |
| Very Active | ≥ S3 * | No | 1 | 1 | 1 | 1 |

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2024. All Rights Reserved.